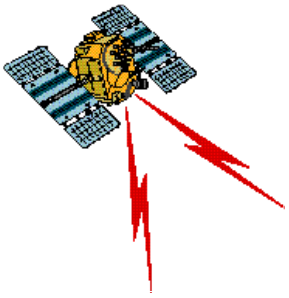
PATHFINDER

VOLUME 7 ISSUE 1 **JAN 2000**

An informal newsletter to the GPS User Community produced by Army Product Manager, GPS, Fort Monmouth, NJ. Information presented is based on published and submitted GPS news items of interest to the general user. Widest dissemination and reproduction is encouraged and newsworthy items are solicited for inclusion. Editor Mr. Don Mulligan at PM, GPS, Fort Monmouth NJ.

The PATHFINDER can be found online at: HTTP://ARMY-GPS.ROBINS.AF.MIL

PM's Corner:



A big **"Thank You"** to unit commanders everywhere for your support of the PLGR reprogramming effort. The cooperation of the chain of command and many field support agencies resulted in a successful Total Army effort to upload corrective software to over 41,000 PLGRs so far. And rest assured that while the warranty period has expired for the oldest PLGRs, we will provide uninterrupted repair service for all PLGRs at all locations. The field procedures for PLGR repair support will not change. I am equally committed to fielding the next generation of GPS technology: The new year will see competitive bidding and the start of the evaluation process on the DAGR program, bringing us closer to the day we begin fielding.

And if you didn't already know it, GPS is everywhere: Look at the family of Army GPS receivers shown in this issue, ranging from common user handheld sets to highly specialized aircraft and survey systems. Some have been in service for over a decade while others are still in development. PM GPS does not manage all of these systems, but we are committed to upgrading or replacing them as the Army moves to the next generation of GPS technology. Led by a high performance security module known as SAASM, the new technology will provide stronger, more accurate GPS receivers that are more resistant to all forms of electromagnetic and environmental interference. If you have questions about this new technology, contact our Tech Management Office.

I invite you to contact myself or any of the PM GPS offices listed in this newsletter. If we can't answer your question, we will find the right person to do so. I cannot address a problem or concern that I don't know about so let me hear from you.

LTC George Eveland

The Family of Army Gps Receiver Systems

AN/ASN-149

UH/OH: The AN/ASN-149 aircraft sets were the first Army receivers. They are 2-channel sets, recently upgraded to extend their service life. They are used in certain low-dynamic aircraft. 100 fielded.

GPS-S

GPS-S: The AN/GSM-13 is a high precision surveyor system based on a commercial design. They are 18-channel sets used exclusively by Army topographic surveyors. 93 fielded.

MAGR

MAGR: The AN/ASN-163 is an early NDI design intended for high performance aircraft. They are 5-channel sets and the Army is using them in selected Electronic Warfare (EW) systems. 149 procured.

Photo unavailable

DAGR

DAGR: The next-generation hand-held GPS receiver will replace or augment PLGR. It will be a multi-channel receiver incorporating the latest GPS technologies. First fielding in FY03. 138,000 planned.

PLGR

PLGR: The AN/PSN-11(V) is the primary Army GPS receiver. They are 5-channel sets used in hand-held mode, mounted to vehicles and integrated to some weapons systems. 83,600 procured.

GPS/INS

GPS/INS: A future product combining miniaturized GPS receiver with an inertial measurement unit. Will provide low-cost GPS technology for a wide range of tracked and wheeled vehicles. Quantity TBD.

SLGR

SLGR: The AN/PSN-10 handheld set was the first lightweight GPS receiver in the Army. They are multi-channel commercial sets bought during Desert Storm and now in limited use. 6,000 procured.

GRAM

GRAM: A future device providing GPS on a circuit card so that it can be embedded into a variety of host systems including computers, projectiles, communications and weapons systems. There will be several different form factors; each suited to a particular host platform. 460,000 planned.

SAGR

SAGR: The AN/ASN-169 is a remanufactured SLGR. They are 5-channel sets incorporating PPS technology. Used to provide stand-alone GPS for non-modernized aircraft. 1,000 fielded.

EGI

EGI and DGNS: Aircraft sets. Although not managed by PM GPS, they are critical elements in the GPS receiver family since they provide GPS to modernized aircraft including Blackhawk, Apache, Kiowa Warrior and Chinook. EGI combines GPS with an inertial navigation system while DGNS combines GPS with Doppler technology. Total of 3,500 being procured.

CUGR

CUGR: The AN/ASN-175 is a modified commercial aircraft system with a navigation database. They are 5-channel sets used exclusively to provide integrated GPS to the UH-1 series aircraft. 785 procured

DGNS

Update **on PLGR Reprogramming**

The last two issues of PATHFINDER have covered this topic extensively so here is a brief summary: A problem was discovered in the standard version PLGR software last year. The glitch could result in errors in the displayed position and time. In June 99, an urgent MWO was issued to provide corrective software. It was made available through your supporting MWO Coordinator, CECOM LAR and on the Internet at www.sed.monmouth.army.mil/rdit. PM GPS dispatched reprogramming assistance teams to Army locations with a high density of PLGRs.

As of late Dec 99, over 41,000 PLGRs have been reported as updated. Make sure your PLGRs are included in that number by getting the software loaded if you have not done so already, and report your serial numbers to your MWO coordinator or CECOM LAR. Check with them if you don't have the necessary hardware cable and software to reprogram your PLGR. For most Army users, a reprogrammed PLGR should display either "613-9854-003" or "613-9544-008" when powered up. (Note: A few PLGRs were fielded with "613-9868-005" and these receivers DO NOT require reprogramming).

For more information or assistance with PLGR reprogramming, contact your MWO coordinator, CECOM LAR or one of the PM GPS offices, starting with Jim or Ed at DSN 992-4733/6136 or contact us by email at any of the PM GPS offices listed in this newsletter.

Olga Lawrence

Program Update **on DAGR**

DAGR is the next generation hand-held GPS receiver. The DAGR will replace or augment PLGR beginning in FY03. It will incorporate new technology to upgrade the performance of GPS receivers for the next decade. During 2000, the DAGR acquisition will proceed into the Risk Reduction Phase. We will receive proposals and bid sample products from potential vendors and start the evaluation process in order to identify the best prototype DAGR. Award of the production contract is scheduled for late FY02 with first fielding to begin in early FY03. For more information concerning the DAGR program, contact MAJ Lisa Kirkpatrick at the Army GPS Office, Los Angeles AFB at (310) 363-2925 or DSN 833-2925.

MAJ Kirkpatrick

Mission Planning Software (MPS)

Are you spending valuable time to manually enter those waypoints to your PLGR for that upcoming FTX? Or maybe you're concerned that some operators may have entered grid coordinates incorrectly?

There is a way to enter waypoints quickly using a conventional keyboard and to upload that data quickly to all unit PLGRs. The solution is to use Mission Planning Software (MPS) on your personal computer and then transfer that data to a PLGR via the PC-PLGR cable. You can then copy the mission data from one PLGR to another PLGR. PM GPS offers Windows-based, easy-to-use MPS for both PLGR and SAGR.

AN/PSN-11 (V)1 (PLGR) Mission Planning Software, Version Number 2.10 - 21 Aug 96
AN/ASN-169 (SAGR) Mission Planning Software, Version Number 1.0 - 5 Dec 95

MPS lets you create waypoints and routes on your PC and upload/download to and from your PLGR or SAGR GPS receiver for field use. You may use the offline mission planning feature to view selected waypoints files, and add, delete, or modify waypoints. MPS requires use of the serial data port cable (PLGR-PC or SAGR-PC cable).
PLGR-PC Cable, NSN 6150-01-375-8664, Class IX
SAGR-PC Cable, NSN 5995-01-396-4867, Class IX

To register as a MPS user, order the latest version of MPS, or get more information, use the request form below or contact Linda Gunter, Georgia Field Office, at Robins AFB, GA, DSN: 468-3288.

Note: The USAF is currently developing MPS for the CUGR. Army pilots are evaluating it and the estimated release date is 3Q FY00. The CUGR MPS software will require a laptop or palmtop computer and a modification of the CUGR wiring harness. Details will be included when the CUGR MPS information is released to the field. Review of the CUGR MPS is

being coordinated by Mr. Willie Jackson at the Georgia Field Office, at DSN: 468-3288.

Willie Jackson

Registration/Request Form for PLGR Mission Planning Software

PLEASE ADD ME TO THE PLGR MPS DISTRIBUTION LIST (CHECK ONE):

1. I NEED A COPY OF MPS. . . . . ☐

2. I ALREADY HAVE MPS, JUST PUT ME ON THE LIST FOR UPDATES. . . . . ☐

UNIT:
_____

_____
(OFFICE SYMBOL)

_____
CITY/STATE/ZIP:

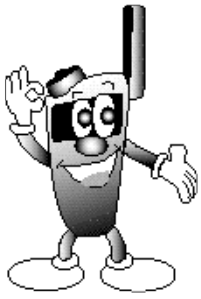
_____
DSN#

_____
E-MAIL ADDRESS:

_____

I CAN RECEIVE UPDATES VIA E-MAIL:
YES ☐ NO ☐

INSTRUCTIONS: Please fill out the request and fax or mail it to the address below. If you have e-mail access, send the same information in an e-mail to frank.rowe@robins.af.mil or linda.gunter@robins.af.mil. The fax number is DSN 468-9091, commercial (912) 926-9091.



WR-ALC/LKNA
(Attn: Linda Gunter)
460 2nd St, Suite 221
Robins AFB, GA 31098-1640

If your e-mail can handle binary files (ZIP files, Word docs, pictures, etc.), please check "Yes" in the block above. We will distribute version updates electronically whenever possible.

Willie Jackson

Aircraft Navigation – Part II

The first installment of this article (Oct 99 Pathfinder) discussed some basics about aircraft navigation and how GPS will be a major element for Instrument Flight Rule (IFR) aircraft navigation. In this second installment we discuss WAAS, LAAS and related FAA plans for satellite-based systems.

Global Air Traffic Management (GATM) is the "umbrella" program covering several initiatives to equip DoD with new or improved communications, navigation and surveillance equipment. GATM has developed as a result of changing airspace architectures and the need for international cooperation to deal with the tremendous growth in worldwide air traffic. The Federal Aviation Administration (FAA) and the International Civil Aviation Organization (ICAO) are leading the effort to establish new procedures that will ensure safe air travel in increasingly crowded skies.

The GATM program can be divided into three elements: Communications, Navigation and Surveillance. For communications, satellite-based systems will allow greater use of data links rather than voice only for communications between the pilot and controller. For navigation, GPS will locate the aircraft more precisely for the pilot and controller. For surveillance, aircraft will be equipped with a traffic avoidance system that automatically reports the aircraft's GPS-based position to ground controllers.

When all three components are implemented, they will allow for a reduction in the separation distance between aircraft and therefore more traffic in the same controlled airspace. To accomplish this objective safely, all aircraft must be equipped with compatible Communications, Navigation and Surveillance systems. The military will no longer be able to say, "FAA rules don't apply to me," if they want to fly in controlled airspace. FAA and

ICAO specifications will define minimum performance standards for each of the GATM component systems. DoD has recognized the need to acquire and install GATM equipment on virtually all military aircraft. New radio systems and a traffic alert/collision avoidance system will fill the requirement for the Communications and Surveillance elements. Since this is a GPS newsletter, lets look at the Navigation element.

The FAA has rated the current GPS system as acceptable for enroute, terminal and nonprecision approaches in properly equipped aircraft but not for primary use during precision approaches. Before the FAA rates GPS as an acceptable "primary means" of navigation for those phases of flight, the accuracy and reliability of the GPS signal must be improved. The FAA plans to accomplish this by two means, the Wide Area Augmentation System (WAAS) and the Local Area Augmentation System (LAAS). WAAS and LAAS will use differential GPS technology to provide greater precision and signal integrity (the "confidence" factor that the GPS signal is correct). Under the current plan, The FAA will introduce WAAS first and will certify GPS as the primary means of navigation for enroute and terminal operations and some precision approaches.

The LAAS system will follow in a few years to further enhance the accuracy and reliability of the GPS signal allowing it to be certified as the primary means of navigation for all phases of flight including all precision approaches. It must be noted that there is still some controversy about the WAAS/LAAS concepts. Although they appear to be a sound way of introducing satellite-based navigation there are concerns about the cost of the equipment and the timetable by which the new system will replace today's ground-based systems. Some feel that there will always be a need for a redundant or back-up system along with a GPS-based navigation system. Since the WAAS/LAAS concept has not received final government approval or funding, the schedule for introducing these services and retiring the current ground-based navigation systems is not firm. The next major step is the approval and funding to introduce WAAS, currently planned for 2001.

Another point: International flight safety can only be guaranteed if all aircraft are equipped to the same standards. Therefore Army aircraft must meet these standards to operate in civil/sovereign airspace systems in peacetime. Tactical missions in a hostile environment may be exempt from GATM but even then, the lack of GATM systems could interfere with aircraft deployment into a theater of operations. The bottom line is that as the milestone for each GATM requirement approaches, Army aircraft will have to be updated. For the navigation component, this means the current Inertial or Doppler based navigation systems will have to be modified to include a differential GPS capability. The plan for implementing GATM will be expensive and stretch out over the next 15 years.

As WAAS and LAAS bring a new reliance upon GPS satellite-based systems, the FAA plans to gradually retire the various ground-based navigation systems that provide today's air traffic control. This includes OMEGA, Loran-C, VOR/DME, TACAN, PLS and TRANSIT. Eliminating these systems will reduce overall air traffic control costs and the number of devices in the cockpit. TRANSIT has already been terminated. The FAA expects to operate the other systems until it is determined that phase-out can occur without harm to air safety.

For more information about FAA management of the US National Airspace System, check out the FAA web site at http://FAA.gov.

Don Mulligan & Paul Gillick (USAASA)

AN/PSN-11 PLGR Repair Actions Authorized at the Unit Level

Change 2 to the PLGR Operations and Maintenance Manual (TM 11-5825-291-13, dated 26 Nov 97) authorized some practical repairs that can be accomplished without returning the PLGR to Rockwell. You are authorized to replace the following externally accessible components:

ITEM	NSN	Price (Dec 99)
Memory Battery Cap assembly	5340-01-449-1033	$32.03
J2/J3 Connector cover mudflap	5340-01-449-1045	$90.48
J4 connector cover mudflap	5340-01-	$15.53

	449-1036	
Prime Battery cap assembly	5340-01-449-1029	$39.78

Okay, you over-tightened the prime battery cap and now it is cracked. Or maybe you lost the memory battery cap or the connector mud flaps came unglued and disappeared. No problem, piece part support has been established so you can now get replacement parts. There is no need to return a PLGR for repair if all you need are replacements for these items. They are not cheap but you can make a repair at your location without sending your PLGR in for repair. Also, since replacing these items is not covered by the warranty, if you perform a local repair you save the Army the average fee of $255 charged for a PLGR requiring non-warranty repair. Check out the instructions in Section 8.1.4 of Change 2 to the PLGR TM dated 26 Nov 97. Part numbers are listed in Appendix F in Change 2. NOTE: Once the tether on the prime battery cap is cut, it does not get replaced so if you install a replacement, there will be no strap connecting it to the PLGR. If further information is required, contact Mr. Ed McAuley, PM GPS Readiness Office, DSN 992-6136, commercial 732-532-6136 or e-mail at edward.mcauley@mail1.monmouth.army.mil. mcauley@mail1.monmouth.army.mil

Ed McAuley & Diana Wright

PLGR Repair Returns

(Warranty and Exclusions)

So you think you have a faulty PLGR and you've checked the battery or power connections and/or the self-test indicates an internal fault. Or maybe there was an accident and your PLGR display screen got whacked or the antenna broken off. Don't put the bad PLGR in a desk drawer and wait until you get 15 or 20 PLGRs! This causes shortages to the warranty and exclusion repair pools as well as shortages to users. Send faulty or damaged PLGRs back for repair as soon as the fault is detected. The procedure is the same for both warranty and warranty exclusion returns. In either case your unit will not be charged for the repair and you will receive a replacement PLGR.

If you have a supporting DS go through them; if not, return it directly. The address is:

DODAAC: EZ7415
Rockwell Collins
855 35th Street NE
ATTN: PLGR Repair, MS 139-141
Cedar Rapids, IA 52402-3613

The October 1999 issue of this newsletter provided a list of "do's and don'ts" for PLGR returns. You can find that issue at the PATHFINDER archive file on our website: http://army-gps.robins.af.mil

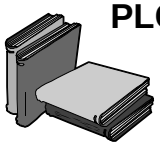
You sent PLGRs in for repair a while ago and are still awaiting replacements so you'd like a status check?

Due to a surge in repair activity during 1999, the turn-around time for repairs increased to about 40 days for warranty work and 90 days for non-warranty (exclusion) repairs. As of Jan 00, the normal repair turn-around times have been restored with 5 days the typical turn-around time to get a warranty replacement item on the way back to a field location.

Your first stop for a status check should be PM GPS. Call, fax or e-mail your serial numbers and unit information and we will research the status and get you an answer. If you can't get through to us, try DCMC Twin Cities direct but they are responsible for many programs and may not be able to research your request immediately. Primary Contact: PM GPS Readiness Office at DSN 992-6136/4733, commercial 732-532-6136/4733 or e-mail at mcauley@mail1.monmouth.army.mil. Alternate Contact: DCMC Twin Cities Rockwell at DSN 894-2044/2032, commercial 319-378-2044/2032 or e-mail at cflickinger@dcmdw.dla.mil

Ed McAuley

PLGR Technical Manual



During reprogramming visits around Army sites, we've noticed a number of units operating with PLGR TMs that do not have Change 1 or Change 2. There is useful information in those changes and we encourage units to order the Changes for their TMs if they do not have them. Change 1 was dated 9 Jun 96 and Change 2 was dated 26 Oct 97.

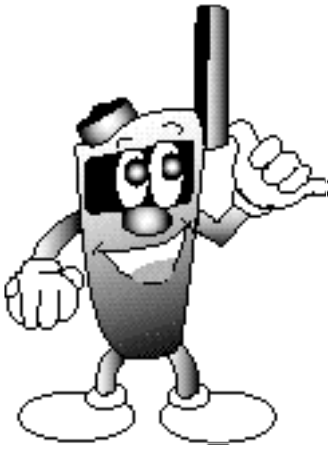
Jim Buggy

It's Official –
SAASM is a Requirement

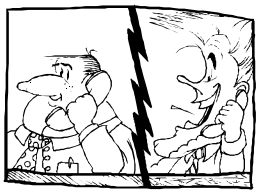
The Army has formally endorsed Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6140.01 dated 15 November 1998 as official Army policy. It states that new GPS acquisitions after January 1st, 2000 must incorporate Selective Availability Anti-spoofing Module (SAASM) technology. SAASM is the next-generation security architecture chosen to implement new cryptographic functions. This requirement applies to all military GPS systems which are Precise Positioning Service (PPS) capable and it makes the approval of a waiver to use commercial GPS systems even less likely than before.

The policy does not require that SAASM be immediately retrofitted to existing GPS receivers but it does require SAASM be included in the upgrade or modification of any existing host platform that uses GPS. The policy therefore has an impact for weapons system managers that plan to upgrade or modify existing weapons systems. The policy reflects a mandate that military GPS users move to a higher level of operational security. SAASM technology will provide Army users with increased accuracy, advanced anti-jam and anti-spoof protections. The Army GPS Office has a central role in SAASM development. For more information, contact Del Crane at DSN 833-0595.

Del Crane



How to Contact PM GPS



For Field Assistance

There is a GPS help line at all three PM GPS locations.

For PM GPS and the Technical Management Division (TMD) at Los Angeles CA, call (310) 363-0595 or DSN 833-0595. E-mail: del.crane@LOSANGELES.AF.MIL

For the Georgia Field Office (GFO) at Warner Robins GA, call (912) 926-3288 or DSN 468-3288. E-mail: johnny.walker@ROBINS.AF.MIL

For the Readiness Management Division (RMD) at Fort Monmouth NJ call (732) 532-4733 or DSN 992-4733. E-mail: james.buggy@mail1.monmouth.army.mil

Who to Call?

For technology including host platform integrations, SAASM, or new GPS receivers, call TMD.

For software support, supply support, distance learning, technical pubs and accessory procurement, call GFO.

For fielding, equipment authorizations, New Equipment Training, maintenance support and host vehicle installations, call RMD.

Lost in Space?

With publication of every issue we get a certain number of newsletters returned as undeliverable mostly due to the reassignment of personnel and the post office does not forward the mail. When this happens we modify the delivery address by replacing an individual's name with either Director or Commander. If you have not received Pathfinder after an address change, call or drop us a line to update your address. For Pathfinder call the editor at DSN 992-6137 or e-mail to mulligan@mail1.monmouth.army.mil.

Pathfinder

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